

# Hernia

# HERNIA

## DEFINITION

- **Hernia** is a protrusion of a viscus or part of a viscus usually within a peritoneal sac through a defect in the abdominal wall
- **Clinically** ; painless swelling characterized by ⇨
  - Reducible or gives history of reducibility
  - Gives expansile impulse on cough.
  - On the anatomical site of hernia defect



## TYPES

### 1- Inguinal hernia

- **above** inguinal ligament (**above** groin crease)

### 2- Femoral hernia

- **below** inguinal ligament (**below** groin crease)

**N.B.:** [ 1 ] & [ 2 ] called **groin hernia**

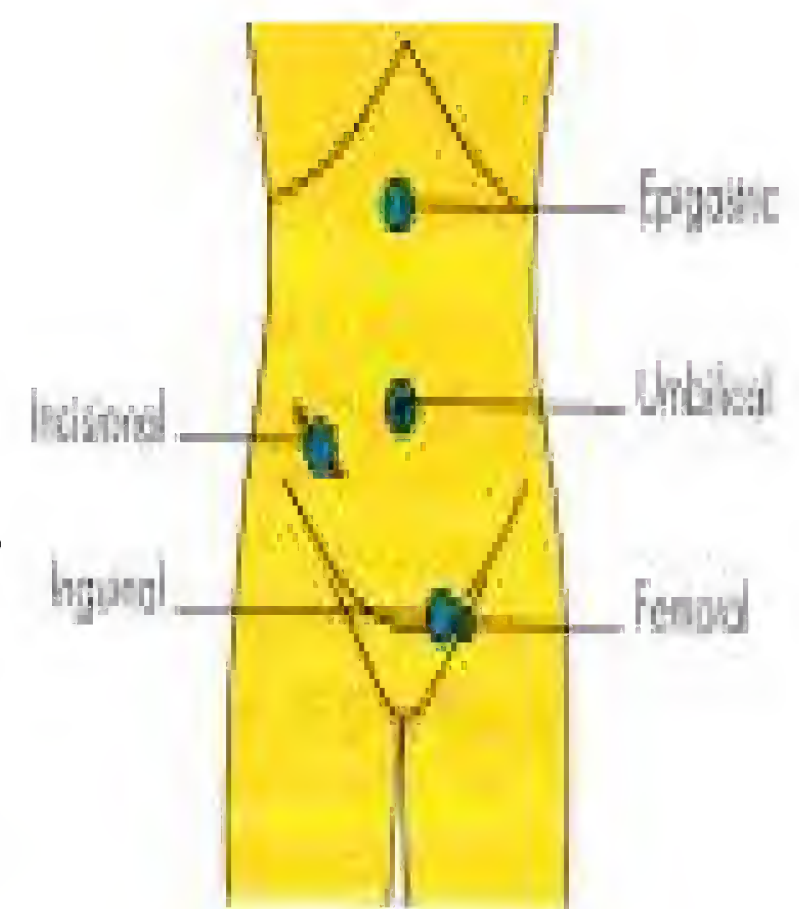
### 3- Umbilical hernia

- **midway** between xiphisternum & symphysis pubis

### 4- Epigastric hernia

- **away** from umbilicus at site of linea alba.

**N.B :** [ 3 ] & [ 4 ] called **abdominal hernia**.

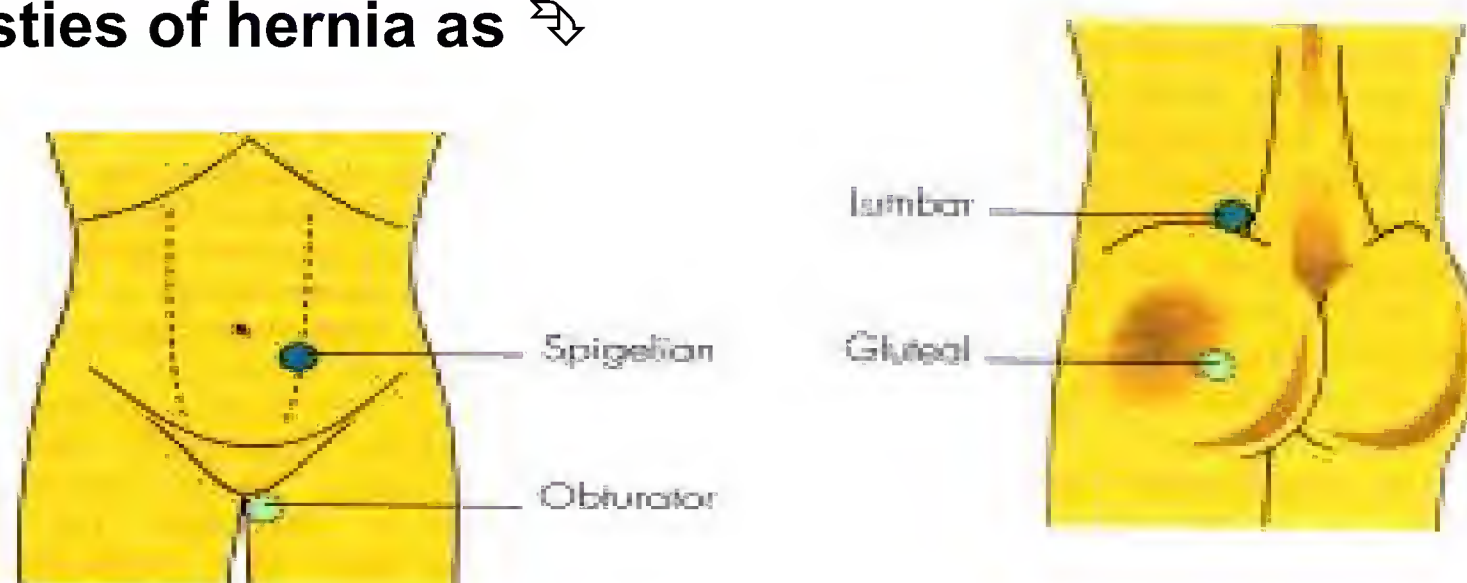


### 5- Incisional hernia

- **paralytic type** : due to injury of the nerve supplying the overlying muscles
- **defective type** : due to defect in the repair of abdominal incision.  
e.g. infection, using absorbable sutures.

### 6- Others

- **Rare sties of hernia as** ⇨



**OBTURATOR HERNIA** through obturator foramen.

**LUMBER HERNIA** through lumbar region.

**GLUTEAL HERNIA** through greater sciatic foramen.

**SCIATIC HERNIA** through lesser sciatic foramen.

**SPIGELIAN HERNIA** through spigelian fascia



## AETIOLOGY

### A- Congenital

due to presence of a **congenital preformed sac**.

- ① Unobliterated processus vaginalis (**congenital O.I.H**).
- ② Unobliterated physiological umbilical hernia of the fetus (**exomphalos**)

### B- Acquired due to ↗

#### 1- ↑ INTRA ABDOMINAL PRESSURE

- **Chronic straining** due to chronic cough, constipation ...etc.
- **Abdominal swelling** due to pregnancy, ascites or organomegaly.
- **Occupational** as porters.

#### 2- WEAKNESS OF ABDOMINAL WALL

- **Obesity** because fats separate the muscle bundles
- **pregnancy** due to stretching of the abdominal wall.
- **Abdominal operations** i.e. abdominal scars.

## COMPONENTS

### A- Sac

- This is the peritoneal pouch which bulges out through the abdominal wall defect. It has a neck, body & fundus

### B- Contents

- It may be any abdominal viscus **except the pancreas**. (being retroperitoneal) the most common are ↗



	ENTEROCELE	OMENTOCLE
<ul style="list-style-type: none"> <li>• <b>Consistency</b></li> <li>• <b>Reducibility</b></li> </ul>	<ul style="list-style-type: none"> <li>• Soft</li> <li>• <b>1<sup>st</sup> part</b> difficult, because of gases &amp; show <b>gurgling</b></li> </ul>	<ul style="list-style-type: none"> <li>• Doughy</li> <li>• <b>Last part</b> difficult, because of adhesion of sac &amp; omentum. &amp; not show <b>gurgling</b></li> </ul>
<ul style="list-style-type: none"> <li>• <b>Percussion</b></li> <li>• <b>Palpation</b></li> </ul>	<ul style="list-style-type: none"> <li>• Resonant</li> <li>• Lobulated surface</li> </ul>	<ul style="list-style-type: none"> <li>• Dull.</li> <li>• Smooth surface</li> </ul>

### Special contents

- 1. RICHTER'S HERNIA** - a portion of circumference of intestine. →  
 - it occurs with femoral hernia.  
 - diagnosed only if strangulated.



### 3. LITTRE'S HERNIA

The content is **Mickle's diverticulum**.

### 2. MAYDL'S HERNIA

It contains 2 loops of the bowel ( **hernia in W** ) → while the intermediate loop lies in peritoneal cavity.



### C- Coverings

- Structures stretched over the sac.



## COMPLICATIONS OF HERNIA

### 1. Irreducibility

#### DEFINITION

Failure to return the contents into the Abdomen.

#### AETIOLOGY

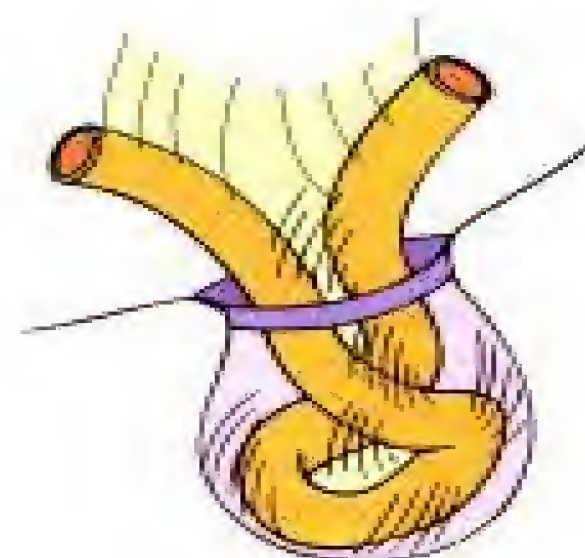
- Adhesions between the contents & the sac.
- Adhesions between the contents themselves.
- Protrusion of new content during strain.

#### D.D

	Irreducible Hernia	Obstructed Hernia	Strangulated Hernia
• Acute obstruction	-	+	+
• Impulse on cough	+	+	-
• Tense & tender	-	-	+

#### TREATMENT

Irreducibility increases the risk of obstruction & strangulation.  
this means early operation ( must be according to type of hernia )  
then cut of adhesions & reduction of hernia.



### 2. Obstruction

#### DEFINITION

Occlusion of intestinal lumen from outside (adhesions) or inside (fecal material) but the blood supply is still **unaffected**

#### AETIOLOGY

Usually 2ry to irreducibility.

#### CLINICAL PICTURE

Symptoms of acute intestinal obstruction  
(colics, vomiting, distention & absolute constipation)

#### DD

	Irreducible Hernia	Obstructed Hernia	Strangulated Hernia
• Acute obstruction	-	+	+
• Impulse on cough	+	+	-
• Tense & tender	-	-	+

#### TREATMENT

Early surgery as DD between it & strangulation is very difficult.





### 3. Strangulation

#### DEFINITION

The hernia becomes strangulated when the blood supply of its content is **seriously impaired**.

#### INCIDENCE

[A] It varies according to the type of hernia

- Inguinal 2 – 4 %
- Femoral 25 – 30 %
- Para-umbilical 15 – 20 %
- Incisional 3 – 5 %

[B] Although the incidence is higher in femoral hernia yet strangulated inguinal hernia account for more than 50 % (as it is more common)

[C] **Strangulation** occur at any age & commoner after prolonged use of **truss**

#### PREDISPOSING FACTORS

1. Irreducibility & obstruction.
2. Sudden expulsion of new contents following straining.
3. Repeated attempts at reduction producing oedema

#### PATHOLOGY

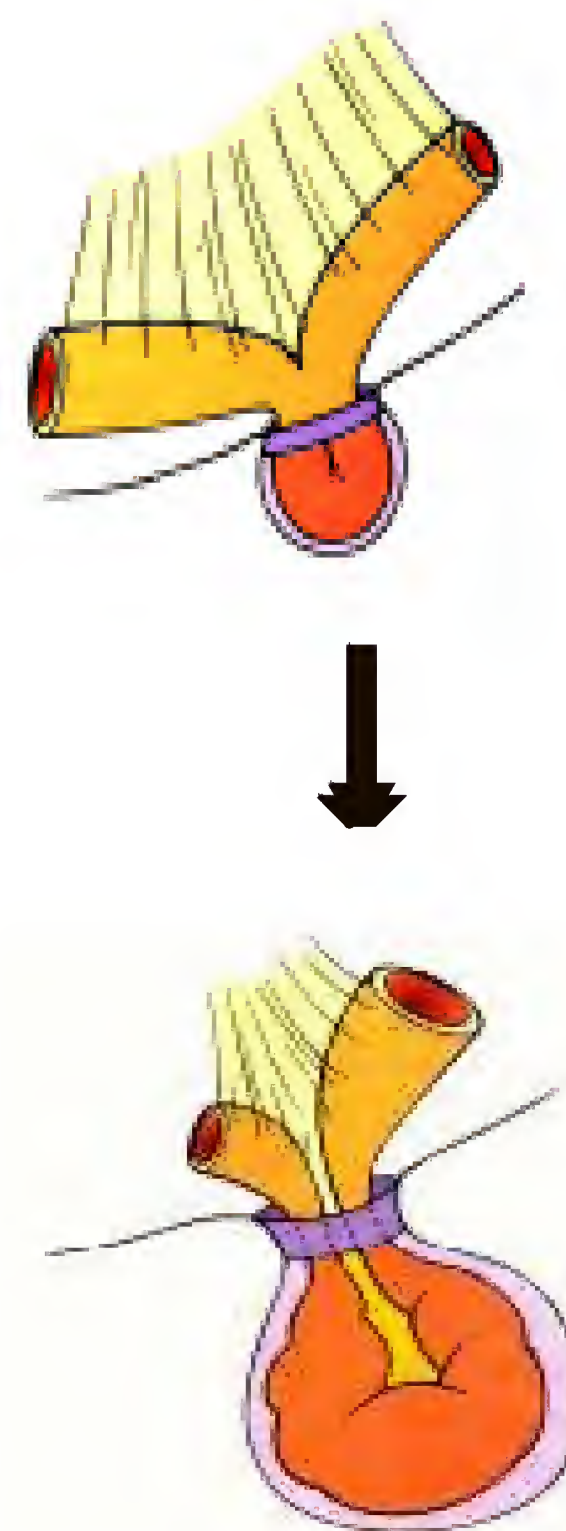
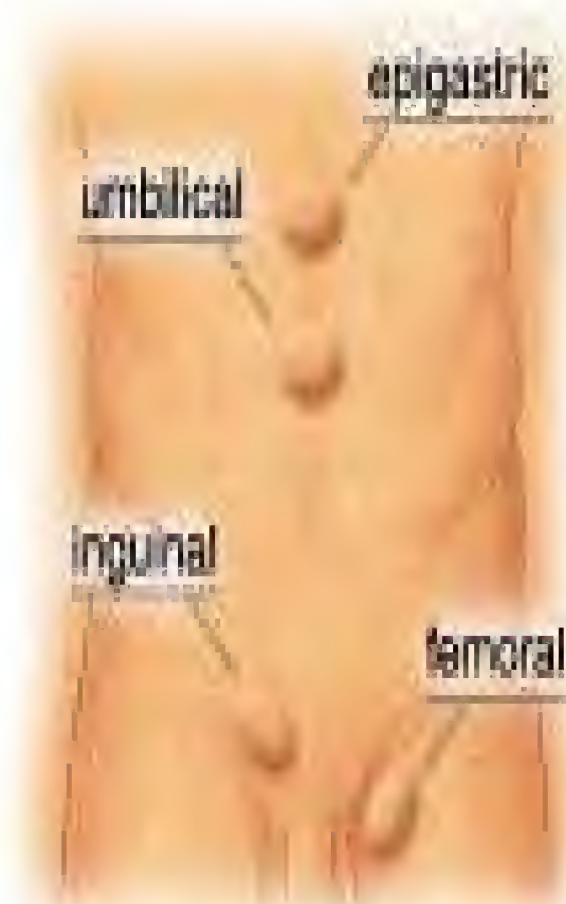
##### A- The constricting agents

- **Any resistant structures** outside the sac like ➤
  - Superficial or deep ring with **inguinal** hernia
  - Sharp edge of lacunar ligament with **femoral** hernia
  - Defect in linea alba with **para-umbilical** hernia
- **Narrow neck** of the hernia sac.
- **Bands of adhesions** within the sac.

##### B- The contents

- Constricting agents will compress the veins in the intestinal mesentery (thin walled) 1<sup>st</sup> → ↑ Venous pressure → oedema & congestion of intestinal loops. if the congestion is marked increased → hemorrhage in intestinal wall & lumen
- **Further** rise of pressure → impairment of arterial blood supply so the contents lose their vitality & may be undergo gangrene.
- **Finally**, gangrene occurs, it starts at ring of constriction then affects the anti-mesenteric border of intestine. if perforated → peritonitis.

**N.B.: Neglected cases** will die from septic shock & dehydration



## CLINICAL PICTURE

### (A) General Examination

- Manifestations of acute intestinal obstruction (colics, vomiting, distention & absolute constipation)
- Hypovolaemic shock & signs of dehydration
- If gangrene occurs → peritonitis → paralytic ileus i.e. no colics which is " bad sign " → finally septicemia → septic shock.

**N.B.:** Manifestations of (A.I.O) are **absent** with 1. Strangulated **omentum**.

2. Strangulated **Richter's** hernia.

3. Strangulated **Littre's** hernia.



### (B) Local Examination

" **Cardinal signs** of strangulation "

1. Tense & tender
2. Irreducible
3. **No** impulse on cough.

## DD

	<b>Irreducible Hernia</b>	<b>Obstructed Hernia</b>	<b>Strangulated Hernia</b>
• <b>Acute obstruction</b>	-	+	+
• <b>Impulse on cough</b>	+	+	-
• <b>Tense &amp; tender</b>	-	-	+

## TREATMENT

[ **Urgent surgery after resuscitation** ]

### A- Immediate resuscitation

- **Ryle's tube** for suction + no oral intake.
- **I.V fluids** to correct electrolyte imbalance
- **I.V blood & Ringer's lactate** to correct hypovolaemia.
- **I.V broad spectrum A.B.** to guard against peritonitis.

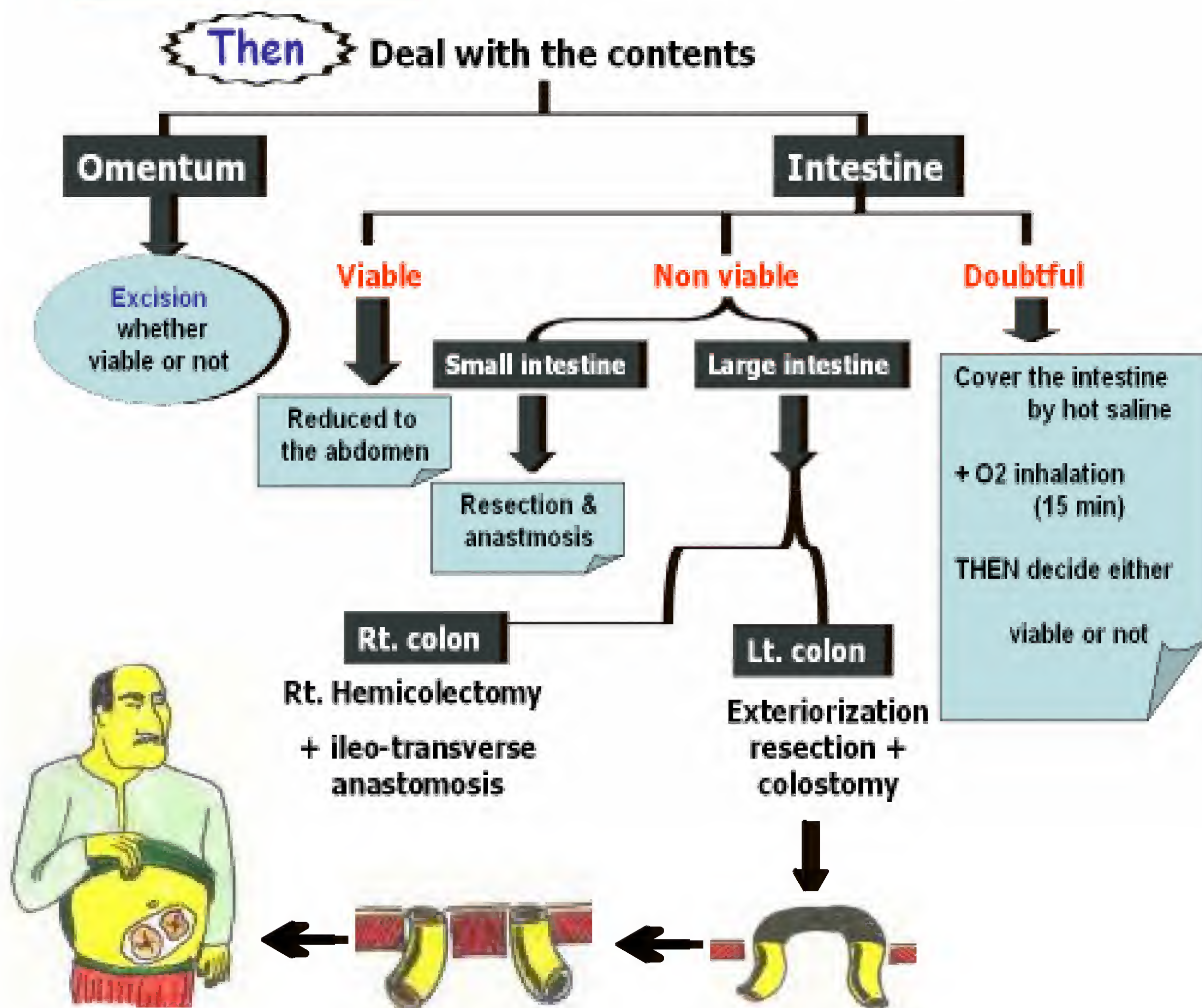
### B- Immediate operation

- **Incision** should be planned to expose the fundus of sac & open it to evacuate toxic fluid 1<sup>st</sup>.
- **The constricting agents** should be divided over a grooved director or the left finger to avoid injury of intestine.
- **The contents** are pulled out & examined, viable or not





	<b>Viabile intestine</b>	<b>Non-viable intestine</b>
<ul style="list-style-type: none"> <li>• <b>Intestinal color</b></li> <li>• <b>Peritoneal luster</b></li> <li>• <b>Mesenteric arteries</b></li> </ul>	<ul style="list-style-type: none"> <li>• Pink or dark red</li> <li>• Present.</li> <li>• Pulsating</li> </ul>	<ul style="list-style-type: none"> <li>• Grey or black.</li> <li>• Absent.</li> <li>• Non pulsating</li> </ul>
<ul style="list-style-type: none"> <li>• <b>By pinching</b></li> <li>• <b>Consistency</b></li> <li>• <b>If injured</b></li> </ul>	<ul style="list-style-type: none"> <li>• Contracts</li> <li>• Firm</li> <li>• Bleeding occur</li> </ul>	<ul style="list-style-type: none"> <li>• No response</li> <li>• Floppy</li> <li>• No bleeding</li> </ul>



- **Repair the hernia defect by prolene sutures (non absorbable)**
- **Subcutaneous drain** is usually used.
- **Post-operative care**
  - a. Continue Ryle's suction with I.V fluid (2 – 3 days)
  - b. Prophylactic A.B.
  - c. Removal of drain after 5 days.



## 4. Inflammation

### DEFINITION

It means inflammation of the contents.

### AETIOLOGY

1. Rough manipulations.
2. Ill fitting truss → repeated rough friction.
3. Inflamed contents ( appendix or meckle's diverticulum )

### CLINICAL PICTURE

The hernia is tender but not tense and overlying skin is red & oedematous.

### TREATMENT

Operation is essential as strangulation cannot be excluded.

## 5. Hydrocele of the hernia sac

### AETIOLOGY

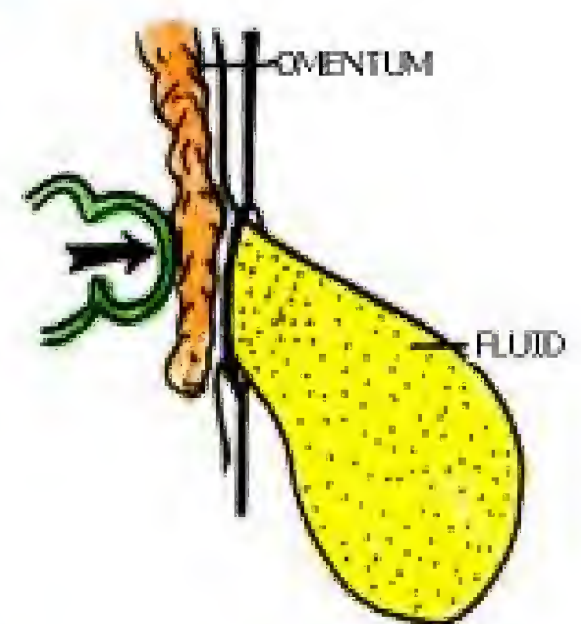
When narrow necked sacs becomes occluded by omentum or adhesions after reduction of its contents → collection of serous fluid in the sac.

### CLINICAL PICTURE

Cystic translucent inguino-scrotal swelling.

### TREATMENT

Excision



## 6. Torsion of the omentum

## 7. Rupture of the hernia sac

## SLIDING HERNIA

### DEFINITION

This is a hernia where a viscus form a part of the wall of the sac & not part of the contents.

### INCIDENCE

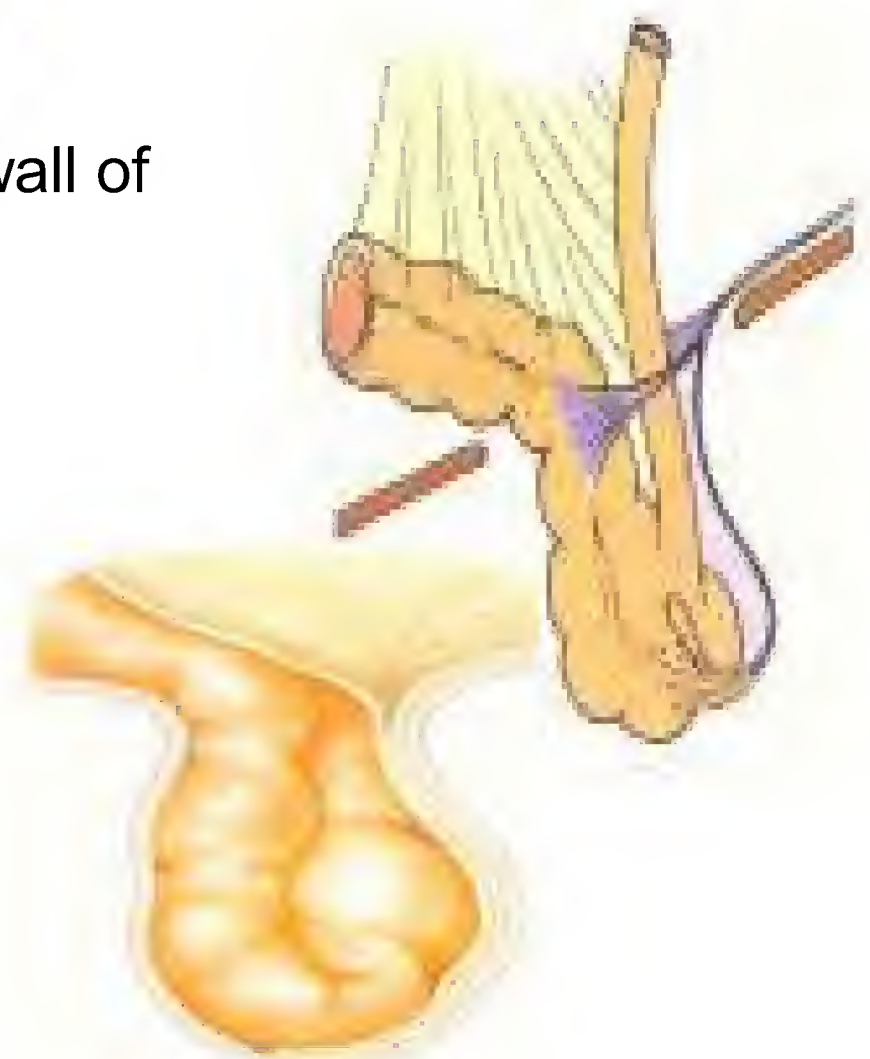
1. Common with long standing hernia & old males
2. The commonest sliding organs are ↗ urinary bladder, caecum & sigmoid colon.

### CLINICAL PICTURE

- **Old** male with **incomplete** reducible complete inguino-scrotal hernia.
- **Urinary symptoms** (double micturation) if sliding urinary bladder.

### TREATMENT

- Do not try to dissect the sliding viscus from the sac as this may lead to devascularisation or injury of the viscus.
- Free the sliding sac & viscus well from the surrounding structures & push them back then good repair is done as hernioplasty.





# SURGICAL ANATOMY OF THE INGUINAL REGION

## Layers of abdominal wall

### Skin

### Superficial fascia

- **Superficial** fatty layer (**Camper's** fascia)
- **Deep** membranous layer (**Scarpa's** fascia)

### 3 Muscles

#### 1. External oblique muscle

- **Origin** : from outer surface of lower 8 ribs.
- **Insertion** : Xiphoid process, linea alba, A.S.I.S, outer lip of iliac crest & pubic tubercle.
- **Surgical importance** :
  - Fibers run downwards, forwards & medially
  - The lower part becomes aponeurotic & it's free border enfolded as inguinal ligament
  - **External (superficial) inguinal ring** is an opening of external oblique aponeurosis.



#### 2. Internal oblique muscle

- **Origin** : from lateral 1/2 of upper surface of inguinal ligament.
- **Insertion** : lower 6 costal cartilage, xiphoid process & linea alba.
- **Surgical Importance** :
  - Fibers run upwards, forwards & medially
  - The lower fibers inserted as **conjoined tendon** with transversus abdominis muscle into the pubic crest & pectineal line.



#### 3. Transversus abdominis muscle

- **Origin** : from lateral 1/3 of upper surface of inguinal ligament & lower 6 costal cartilage.
- **Insertion** : Xiphoid process & linea alba.
- **Surgical Importance:**  
It is inserted as **conjoined tendon** with internal oblique muscle.



### Fascia transversalis

- Thin but strong fascial layer lies in front of the peritoneum.
- **Internal (deep) inguinal ring** is an opening of fascia transversalis



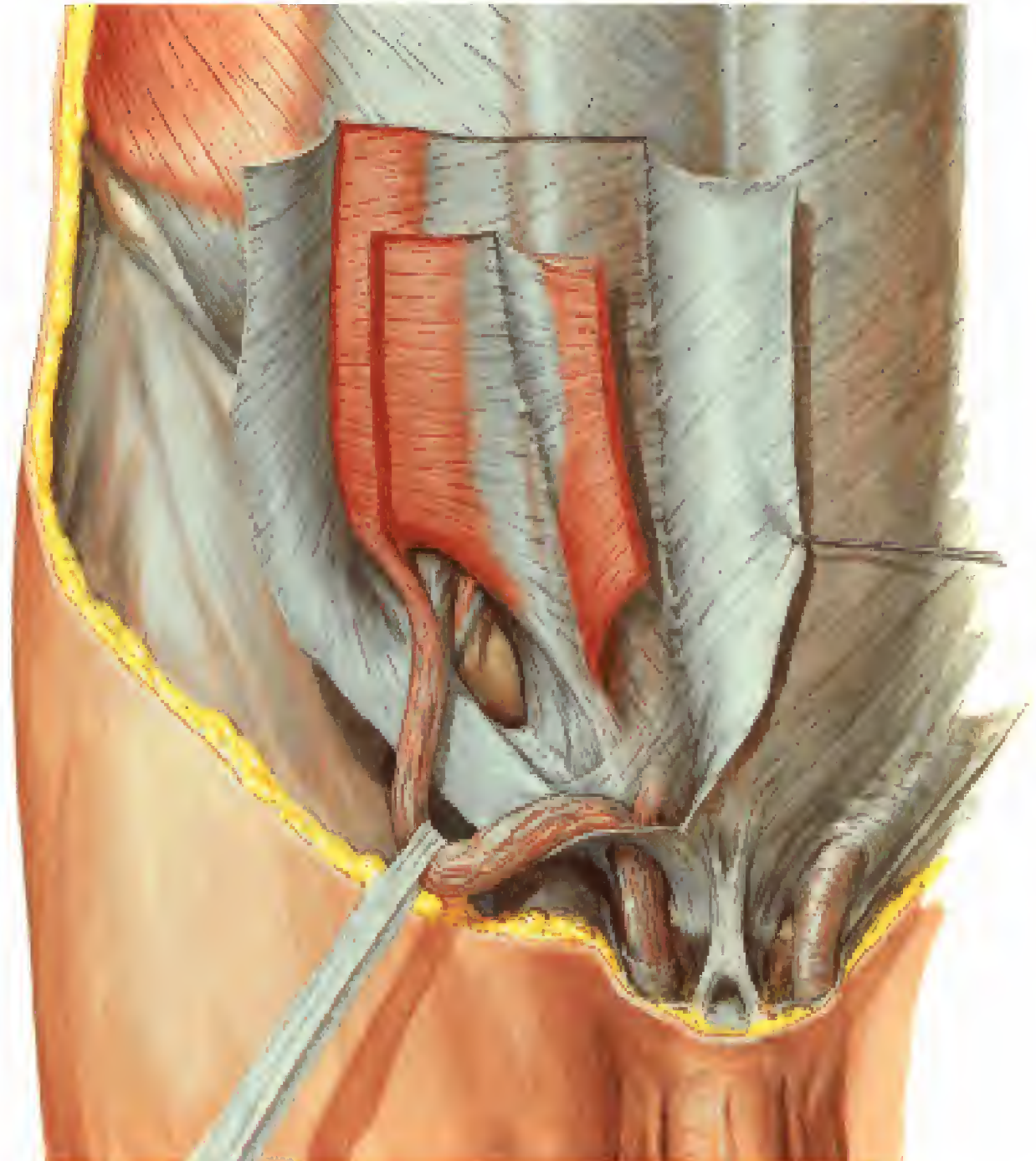
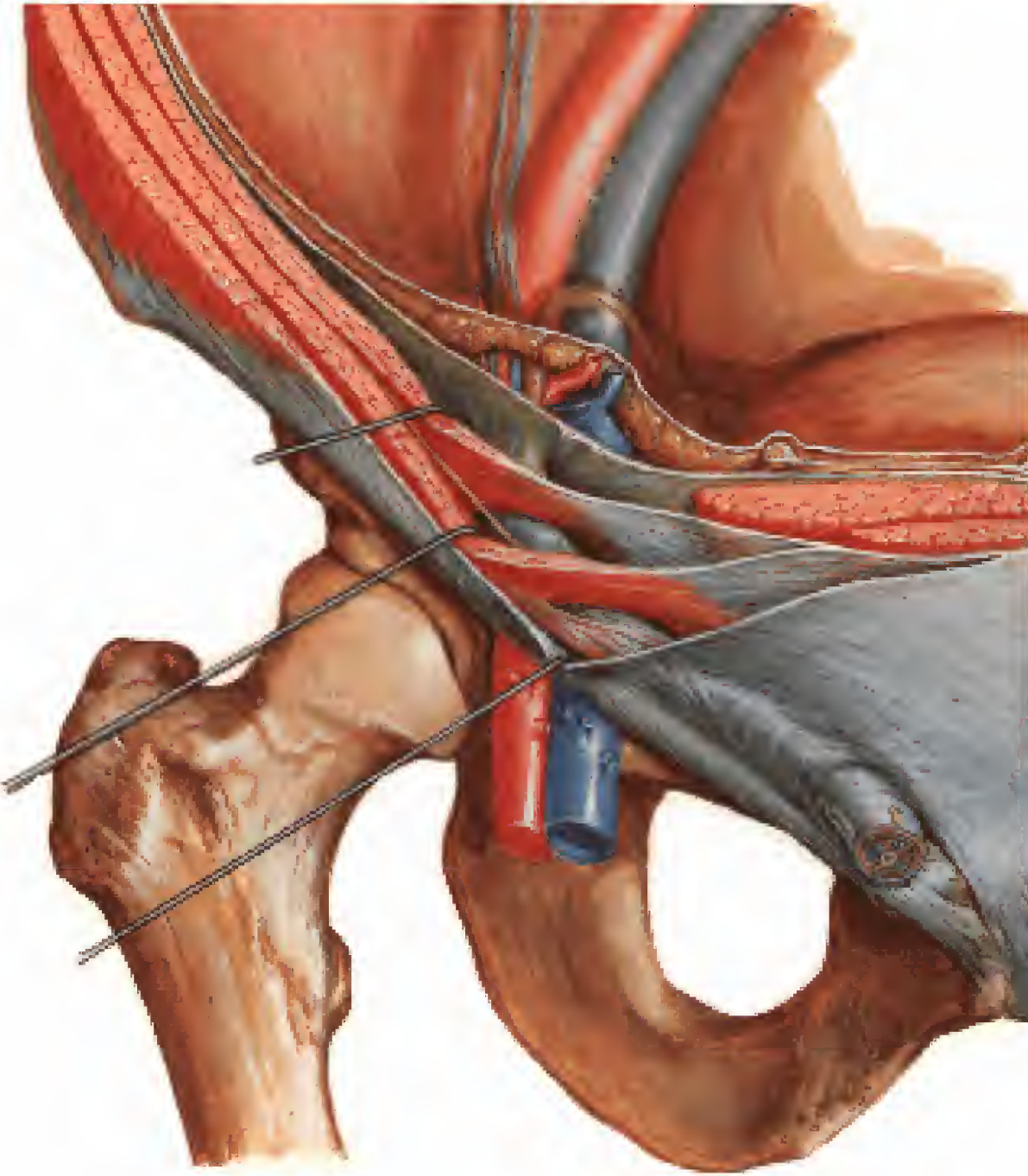
## INGUINAL CANAL

### DEFINITION

- It is an oblique passage in the lower part of the anterior abdominal wall, through which the testis passes in order to leave the abdomen & reach the scrotum

### LENGTH & SITE

- Its length about **1.5 inches (4 cm)** and passes downward, forward & medially from deep to superficial ring, it lies parallel to the medial half of the inguinal ligament



### BOUNDARIES

#### Beginning

- **Deep inguinal ring :**
  - An opening of fascia transversalis
  - 1/2 inch above the **mid inguinal point**  
( point midway between A.S.I.S & symphysis pubis )
  - It is an **inlet** for spermatic cord.
  - The inferior epigastric vessels run **medial** to it.

#### **N.B.: Mid-point of inguinal ligament**

( point midway between A.S.I.S & the pubic tubercle )

#### End

- **Superficial inguinal ring :**
  - A triangular opening of external oblique aponeurosis
  - 1/2 inch above & medial to pubic tubercle.
  - It is an **exit** for spermatic cord & ilio-inguinal nerve.



### Anterior wall

- External oblique aponeurosis.
- Lower parts of internal oblique muscle **laterally**.

### Posterior wall

- Fascia transversalis.
- Conjoined tendon **medially**.

### Floor

- **Upper grooved surface** of inguinal ligament

### Roof

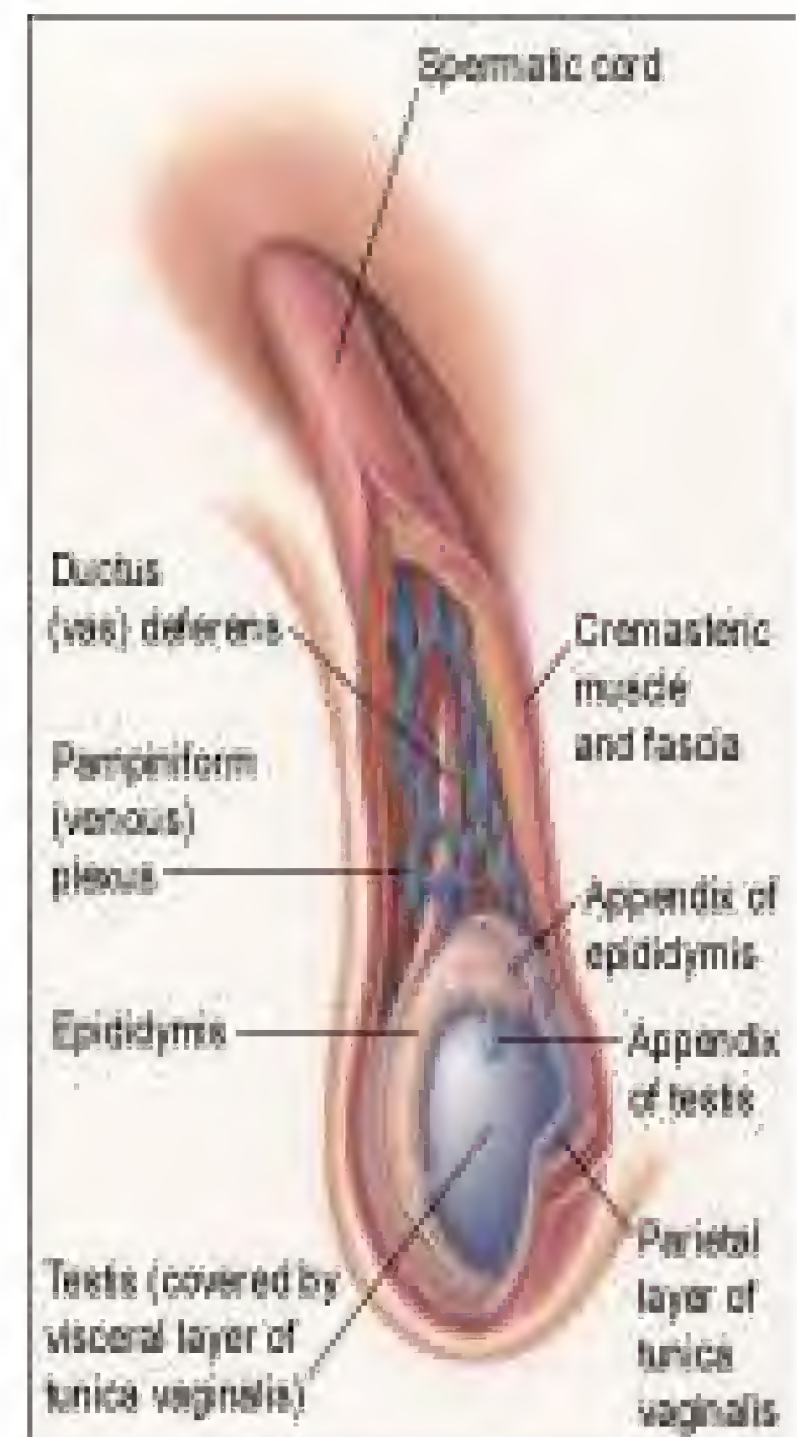
- **High arched** fibers of conjoined tendon

### CONTENTS

- **Ilio-inguinal nerve**  
which pierces the posterior wall of the canal then passes through superficial inguinal ring.
- **Spermatic cord** if male  
or **round ligament** if female

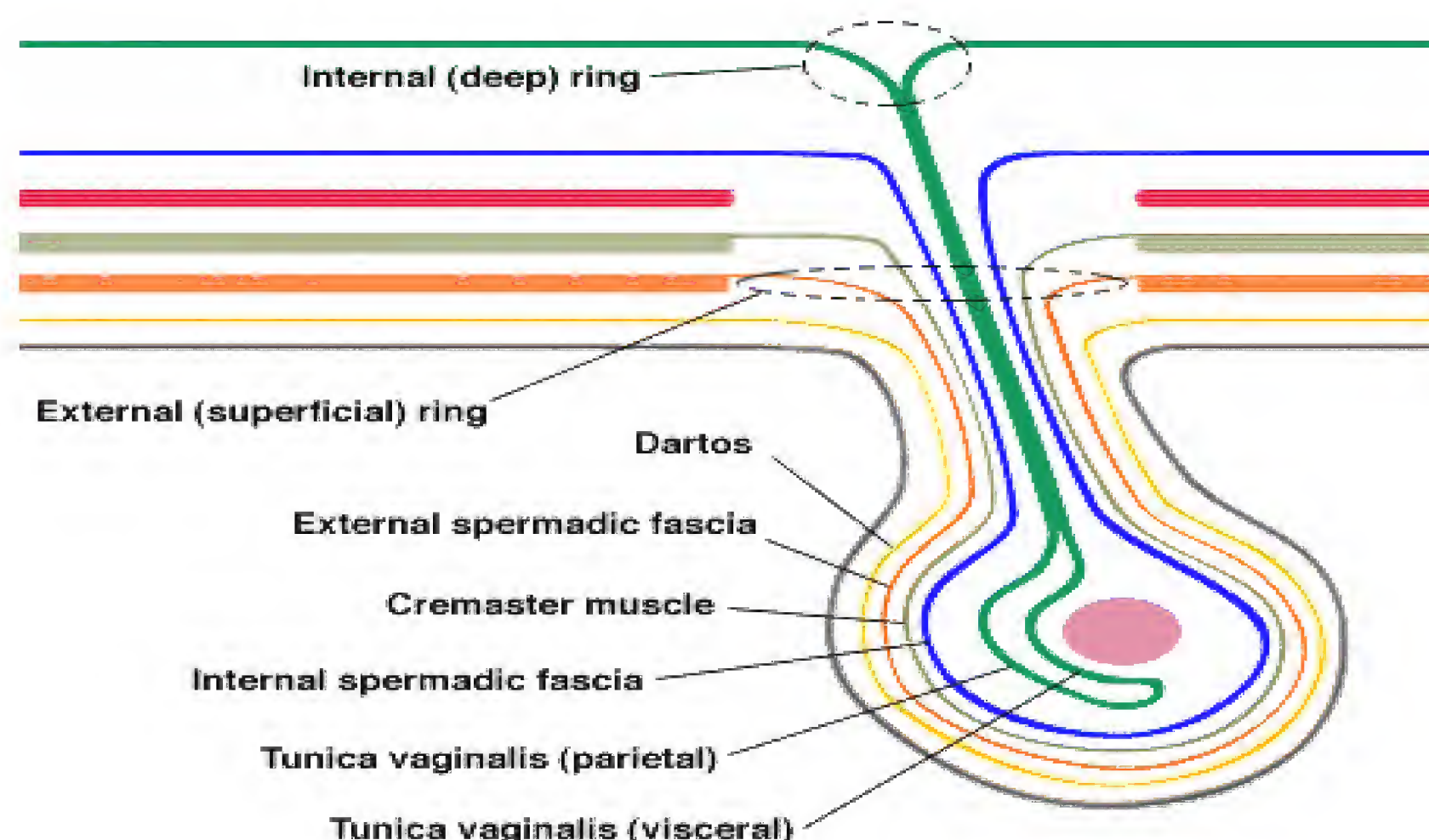
### Contents of the spermatic cord

- **Vas** deferens.
- **Artery** of vas & testicular artery.
- **Vein** of vas & pampiniform plexus.
- Autonomic **nerves**.
- Testicular **lymphatic**
- **Vestige** of processus vaginalis.
- Genital branch of genito-femoral nerve.



### Coverings of the spermatic cord

- **External spermatic fascia** from external oblique aponeurosis.
- **Cremasteric muscle** from internal oblique muscle.
- **Internal spermatic fascia** from fascia transversalis.





## FACTORS PREVENT INGUINAL HERNIA

### 1. Inguinal canal is oblique

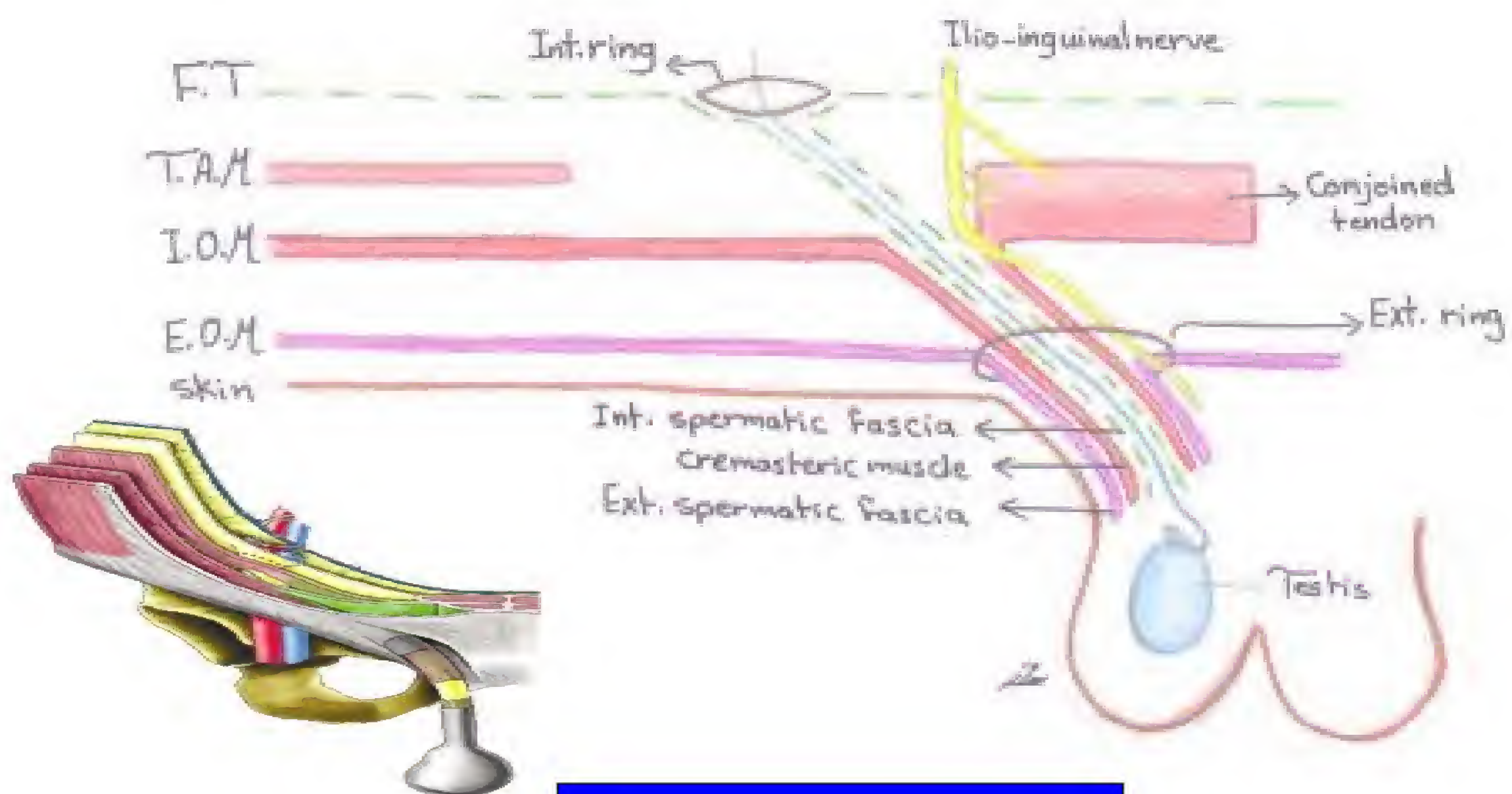
So the internal ring & external ring not at same plane.

### 2. During ↑ intra-abdominal pressure The followings occur ⇨

- Contraction of **anterior abdominal wall** so that the anterior & posterior wall of inguinal canal are approximated.
- Contraction of **external oblique muscle** leads to narrowing of superficial ring.
- Contraction of **cremasteric muscle** leads to elevation of scrotum so closure of superficial ring occur.

### 3. Shutter mechanism

- Due to **triple** relation of the lower fibers of **internal oblique muscle** to the inguinal canal. In the (anterior, roof & posterior wall)
- So that contraction of this muscle during strain leads to closure of inguinal canal around the spermatic cord.



## HASSELBACH TRIANGLE

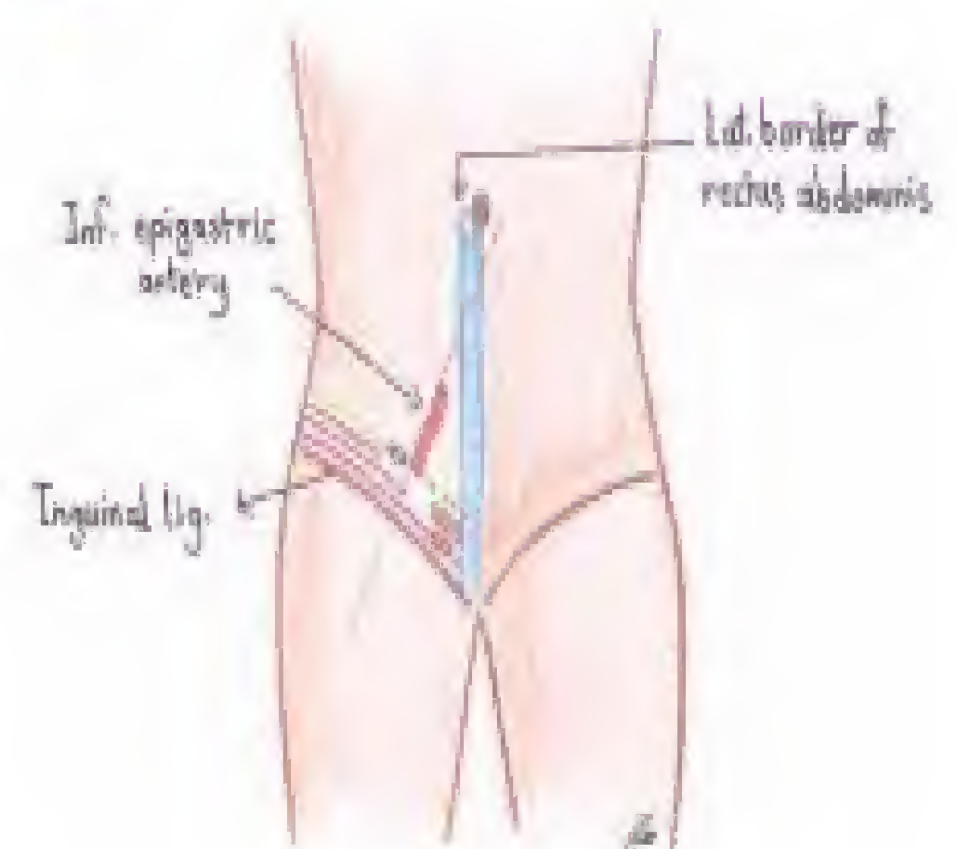
- Direct inguinal hernia protrude through this triangle

### Site of Hasselbach triangle

medial part of posterior wall of inguinal canal

### The Boundaries

- **Medially** : lateral border of rectus sheath.
- **Laterally** : inferior epigastric vessels.
- **Inferiorly** : inguinal ligament.





## I- INGUINAL HERNIA

### AETIOLOGY

### INCIDENCE





### PATHOLOGY

a. Defect

b. Sac

c. Content

d. Coverings

Indirect (Oblique) Inguinal Hernia	Direct Inguinal Hernia
	
<ul style="list-style-type: none"> <li>• Congenital preformed sac</li> <li>• Acquired causes</li> </ul>	<ul style="list-style-type: none"> <li>• Paralysis of ilio-inguinal nerve during appendectomy</li> <li>• Acquired causes</li> </ul>
<b>80 %</b>	<b>20 %</b>
<ul style="list-style-type: none"> <li>• <b>Deep ring</b> <u>lateral</u> to inferior epigastric artery</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Hasselbach Δ</b> <u>medial</u> to inferior epigastric artery</li> </ul>
<ul style="list-style-type: none"> <li>• It presents <b>inside</b> the cord</li> </ul>	<ul style="list-style-type: none"> <li>• It presents <b>behind</b> the cord.</li> </ul>
Small intestine, omentum or both	
	
<b>IN INGUINAL REGION</b>	<b>INGUINAL REGION</b>
<ol style="list-style-type: none"> <li>1. Skin.</li> <li>2. Superficial fascia</li> <li>3. Ext. oblique aponeurosis</li> <li>4. Cremasteric muscle.</li> <li>5. Int. spermatic fascia.</li> <li>6. Extra-peritoneal fat</li> </ol>	<ol style="list-style-type: none"> <li>1. Skin.</li> <li>2. Superficial fascia</li> <li>3. Ext. oblique aponeurosis.</li> <li>4. Conjoined Tendon.</li> <li>5. Fascia transversalis.</li> <li>6. Extra-peritoneal fat</li> </ol>
<b>IN THE SCROTUM</b>	
<ol style="list-style-type: none"> <li>1. Skin</li> <li>2. Superficial fascia with dartos muscle.</li> <li>3. Ext. spermatic fascia</li> <li>4. Cremasteric muscles.</li> <li>5. Int. spermatic fascia.</li> <li>6. Extra-peritoneal fat</li> </ol>	



CLINICAL PICTURE	Indirect (Oblique) Inguinal Hernia	Direct Inguinal Hernia
<ul style="list-style-type: none"> <li>• Age</li> <li>• Side</li> <li>• Shape.</li> <li>• Descent</li> <li>• Descent to scrotum</li> <li>• Reduction.</li> <li>• Internal ring test</li> <li>• External ring test</li> <li>• Complications</li> </ul>	<ul style="list-style-type: none"> <li>• Any age.</li> <li>• <b>Less</b> common bilateral</li> <li>• Pyriform (oblong)</li> <li>• Downwards, forwards &amp; medially</li> <li>• Can descend.</li> <li>• Upward, backwards &amp; laterally.</li> <li>• Hernia <b>does not</b> protrude</li> <li>• impulse at <b>tip</b> of little finger.</li> <li>• <b>More</b> common</li> </ul>	<ul style="list-style-type: none"> <li>• Usually old age</li> <li>• <b>More</b> common bilateral</li> <li>• Hemispherical (rounded)</li> <li>• Forwards</li> <li>• Extremely rare.</li> <li>• Backwards</li> <li>• Hernia protrudes</li> <li>• impulse at <b>medial</b> side of little finger.</li> <li>• <b>Less</b> common.</li> </ul>

## SPECIAL TYPES

### Indirect (oblique) inguinal hernia

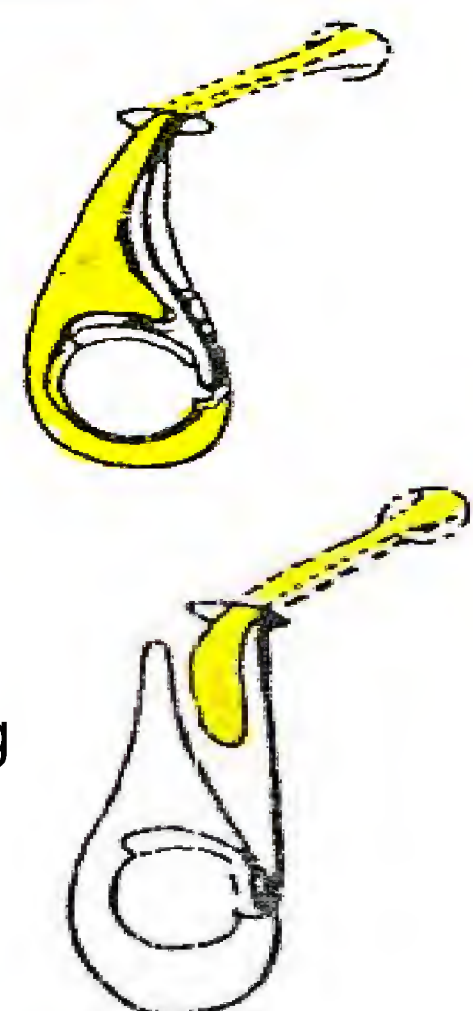
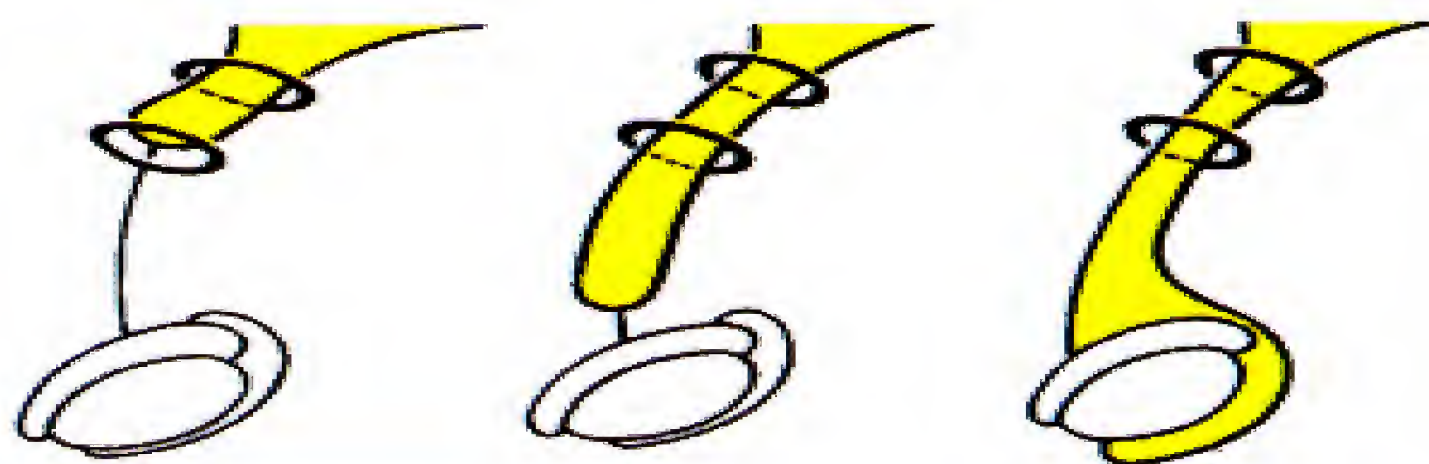
#### 1. Congenital hernia

- due to persistence patency of processus vaginalis.
- it reaches down the scrotum from the start and the Testes lies among the content
- although congenital, it may appeared with adult life.

#### 2. Infantile hernia (operative finding only)

- the tunica vaginalis extends upwards to the external ring & another true hernia sac passes behind it i.e. 2 sacs.

#### 3. Adult type which may be ➡



#### BUBONOCELE TYPE

Hernia is limited to the inguinal canal & seen as bulge or mass at inguinal region

#### FUNICULAR TYPE

Hernia passes with cord & stops just above the epididymis

#### COMPLETE SCROTAL HERNIA

Hernia descends to the bottom of scrotum.



## SPECIAL TYPES

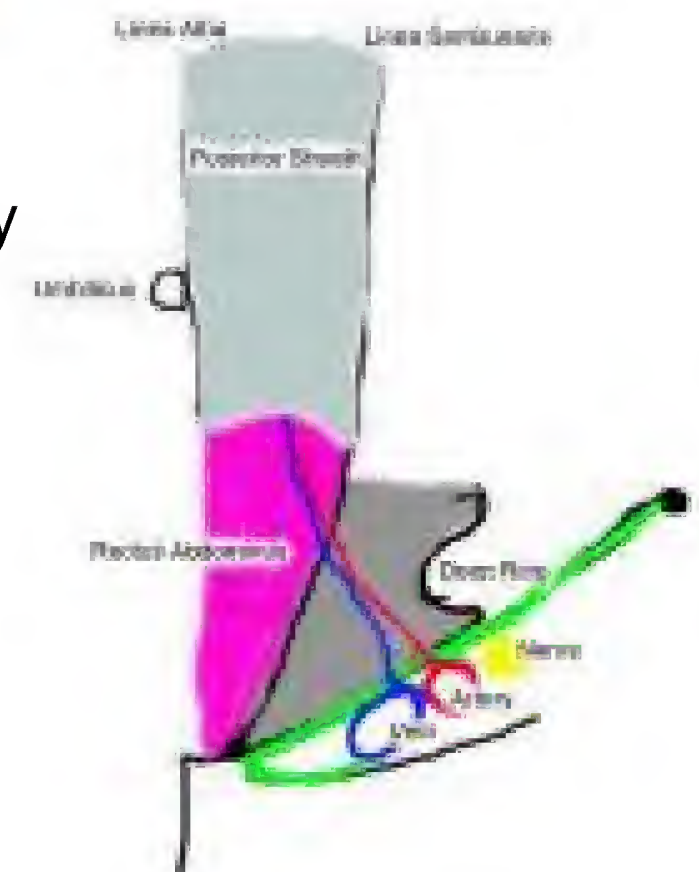
### Direct inguinal hernia

#### 1. Lateral type

- Hernia bulges through the **lateral** part of Hasselbach's  $\Delta$  (made by fascia transversalis only) & thus it has a very **wide** neck & it is **less** liable to complicate.
- Hernia **never** descends to the scrotum

#### 2. Medial type

- Hernia bulges through the **medial** part of Hasselbach's (defect in conjoint tendon in front of fascia transversalis) & thus it has a very **narrow** neck & it is **more** liable to complicate.
- Hernia **may** descends to the scrotum; but never reach the bottom.



## DD OF INGUINAL & INGUINO-SCROTAL SWELLINGS

### Inguinal swellings

1. **Hernia** : Oblique inguinal hernia (bubonocoele or funicular types) & direct inguinal hernia.
2. **Hydrocele** : Hydrocele of hernia sac.
3. **Testis** : Undescended, ectopic or retractile testicle.
4. **Cord** : Lipoma of the cord.

### Inguino-scrotal swellings

1. **Hernia** : Oblique inguinal hernia (complete type)
2. **Hydrocele** : Hydrocele of hernia sac, congenital & infantile types
3. **Testis** : Retractable testicle.
4. **Cord** : Varicocele

## MANAGEMENT OF INGUINAL HERNIA

### Investigations

- 1- **To detect underlying cause of  $\uparrow$  I.A.P**  
As chest X-ray, abdominal U/S & trans-rectal U/S for S.E.P
- 2- **To assess surgical fitness of the patient**  
As E.C.G, blood picture, blood sugar & kidney function tests

### Treatment

#### 1. TRUSS

- **Indication** :  
If patient unfit for surgery.
- **Complications** :
  1. Infection.
  2. Adhesions  $\rightarrow$  strangulation.
  3. Pressure atrophy of local muscle.



#### 2. OPERATIONS See next page



## CHOICE OF OPERATION

For more details  
see  
Operative notes



## Indirect (oblique) inguinal hernia

### Herniotomy

- Removal of hernia sac after reduction of the contents

#### INDICATED WITH ↗

- ① infants
- ② children < 12 years
- ③ **small** hernial defect in adult with good musculature

### Herniorrhaphy

- **Herniotomy** + narrowing the defect & repair of post. wall of inguinal canal through one of the following methods ↗

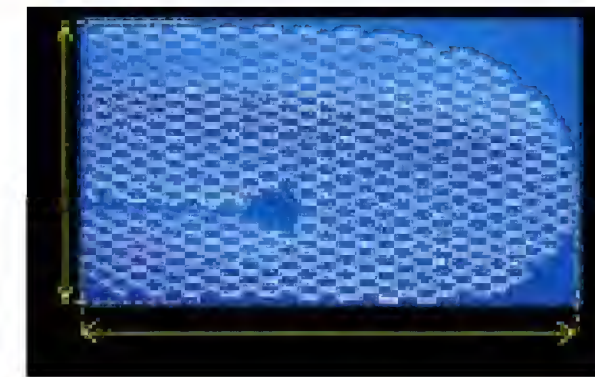
- 1- **Bassini** repair.
- 2- **Shouldice** repair.
- 3- **Mc vay** repair.

#### INDICATED WITH ↗

**large** hernial defect in adult with good musculature

### Hernioplasty

- **Herniotomy** + repair the defect by synthetic material i.e **prolene mesh**



#### INDICATED WITH ↗

- ① old patient with weak musculature
- ② very wide defect
- ③ recurrent hernias

## Direct inguinal hernia

### Management of direct hernias, differs from indirect hernias in

- ① The sac is medial to inferior epigastric vessels.
- ② The sac lies behind the cord & not within its covering.
- ③ The sac & defect are wide, so the sac is not excised & just invaginated by repair i.e. **herniorrhaphy** or **hernioplasty**.

## RECURRENT INGUINAL HERNIA

### AETIOLOGY

1. Leaving part of the original sac.
2. Missing a second sac at operation e.g. **pantaloon hernia**.
3. Use of absorbable sutures in hernia repair
4. Postoperative hematoma or infection → weakness of the repair
5. Rapid return to hard work

### TREATMENT

Correction of predisposing factors + **hernioplasty**



## SURGICAL ANATOMY

### FEMORAL SHEATH

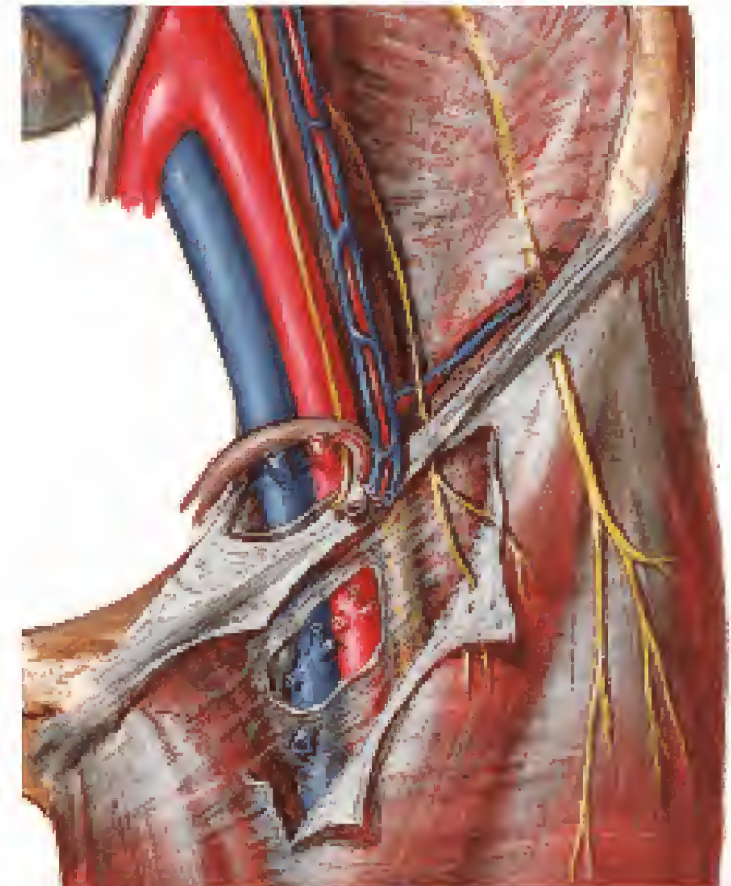
#### Anterior femoral sheath

Formed of **fascia transversalis**

#### Posterior femoral sheath

Formed of **fascia iliacus**

- The **femoral sheath** is divided by **2** thin fibrous septum Into **3** compartments.
- The most medial compartment of femoral sheath is called **femoral canal**.
- The Intermediate compartment contains the femoral **vein** & the lateral compartment contains the femoral **artery**

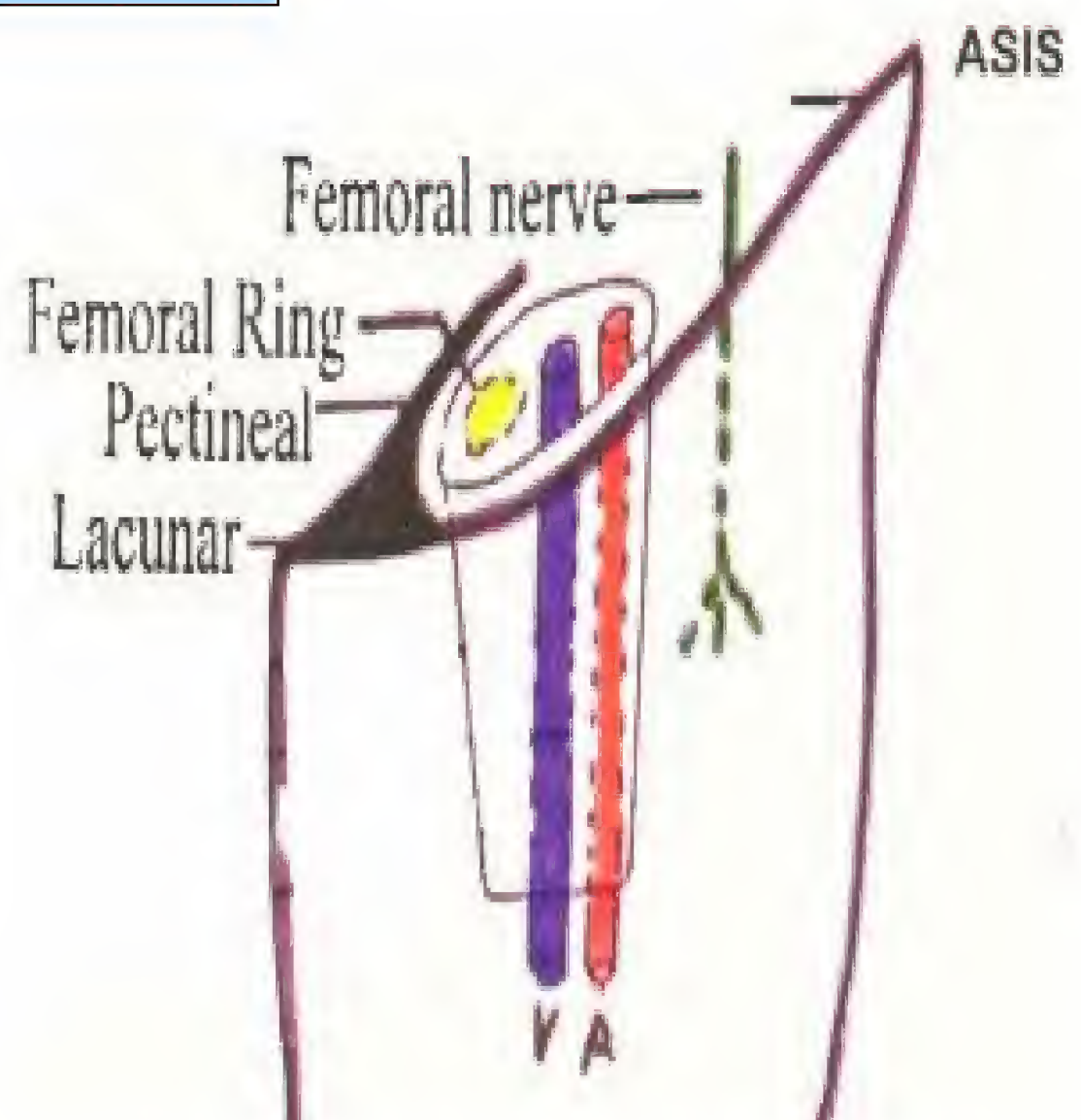


**N.B.:** The femoral nerve lies outside the sheath

### FEMORAL CANAL

#### Structure

- The most medial compartment of femoral sheath
- Cone shaped (**1/2** inch long)
- Its **mouth** (**femoral ring**)
- Its **apex** is formed of fusion of medial border of femoral sheath & septum between the femoral canal and the femoral vein.



#### Contents

- Fat, lymphatics & lymph node of **Cloquet**

#### Function

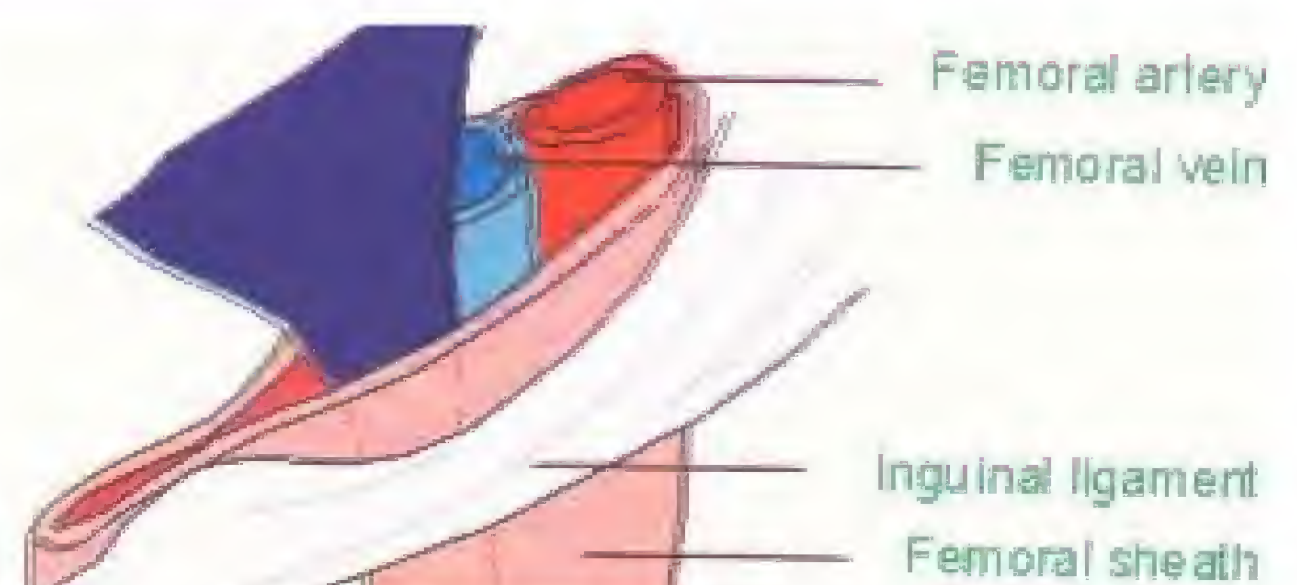
- Give space for expansion of femoral vein during ↑ venous return with lower limb exercise

### FEMORAL RING

#### Mouth of the femoral canal

#### Boundaries

- **Anterior** : Inguinal ligament ( **Poupart's** ligament )
- **Posterior** : **Cooper's** ligament ( **Pectineal** ligament)
- **Medially** : ( **Lacunar** ligament )
- **Laterally** : Femoral vein





## II- FEMORAL HERNIA

### DEFINITION

- Hernia which leaves the abdomen through the femoral ring into the femoral canal

### AETIOLOGY

- Always acquired **never** congenital

### PATHOLOGY

a. **Defect : Femoral ring**

b. **Sac :** passes **downwards** in the femoral canal then **forwards** stretching the cribriform fascia of the saphenous opening then **upwards & laterally** towards A.S.I.S.

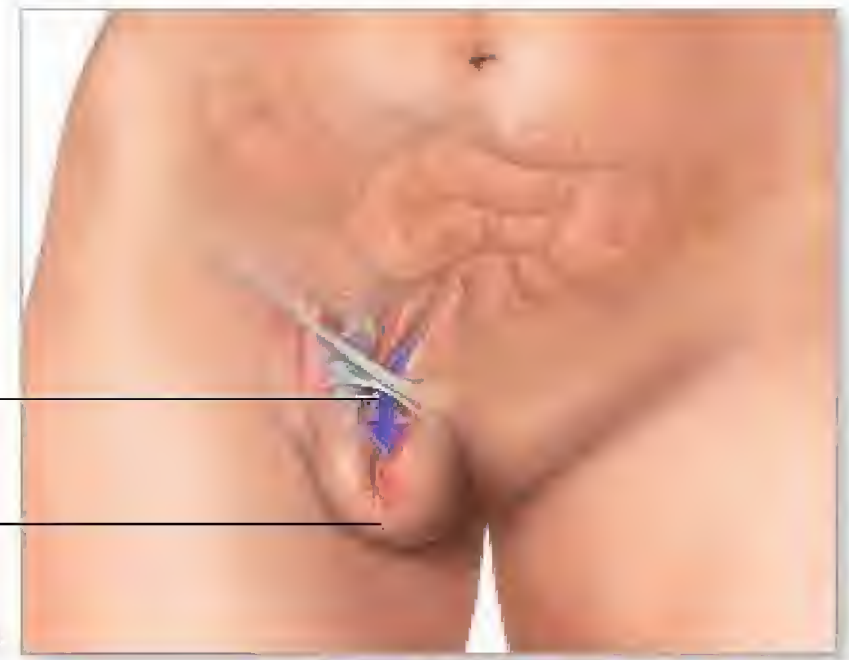
**so femoral hernia is liable to be strangulated**

c. **Contents :** Omentum, bowel or both.

d. **Coverings :**

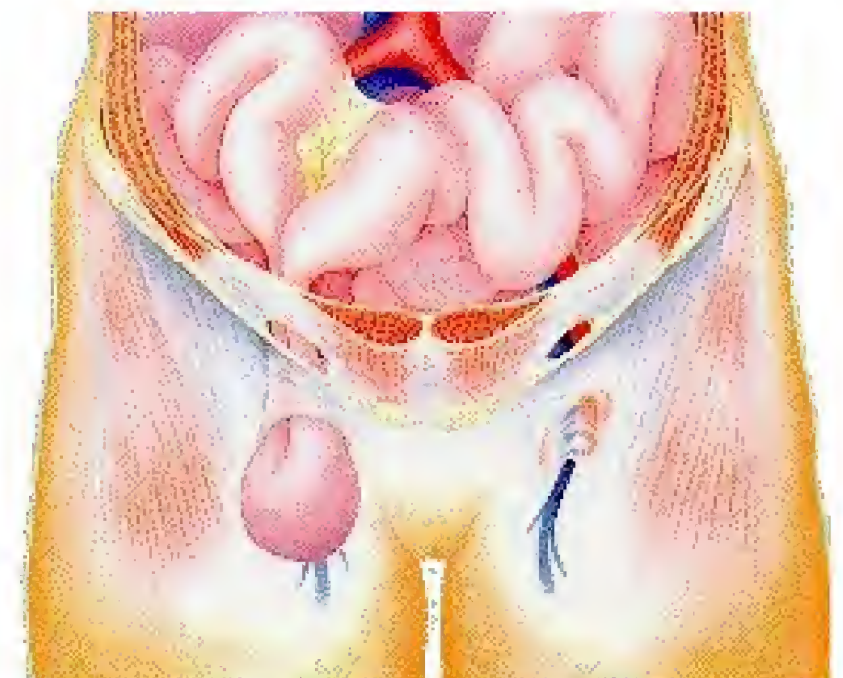
1. Skin.
2. Superficial fascia
3. Stretched **cribriform fascia**
4. Anterior femoral sheath

Femoral hernia  
Herniated intestine causing visible bulge



### CLINICAL PICTURE

- **Hernia** is common in **females** due to ↗
  - (1) The female pelvis being larger  
→ ↑ abdominal pressure
  - (2) Small sized femoral vein  
→ wide femoral ring
- **Hernia** is characterized by ↗
  - Present below the medial part of inguinal ligament.
  - Present below & lateral to the pubic tubercle.
  - Gives an expansile impulse on cough.
  - It can be reduced downwards, backwards & finally upwards,

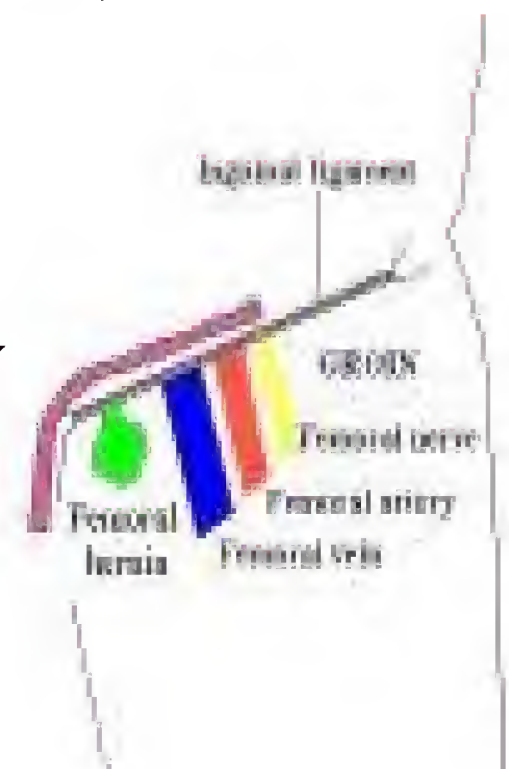


### DIFFERENTIAL DIAGNOSIS

#### Reducible femoral hernia

**REDUCIBLE INGUINAL HERNIA** which characterized by ↗  
Above & medial to pubic tubercle

**FEMORAL ANEURYSM** which characterized by ↗  
Expansile pulsation & moves along but not across the course of artery.





**PSOAS ABSCESS** which characterized by ↗  
Cross fluctuation

**SAPHENA VARIX** which characterized by ↗  
Thrill on cough, completely disappear on lying down, venous hum on auscultation & apparent varicose vein.

### Irreducible femoral hernia

### IRREDUCIBLE INGUINAL HERNIA

**LIPOMA** which characterized by ↗  
Soft, lobulated surface, slippery edge, superficial to muscles, skin over show dimpling, painless & pseudo-fluctuant swelling

### INGUINAL L.Ns

**ILIOPSOAS BURSA** which characterized by ↗  
Associated osteoarthritis of hip joint

### TREATMENT

#### Surgery is the only line of treatment

( 3 Approaches )

#### 1- Low approach

- This approach is **rarely done nowadays**, because of low transfixation of the sac which is therefore not completely excised.
- The incision **1/2** inch below & parallel to the inguinal ligament.
- **The repair** : by suturing the inguinal ligament (anterior border of femoral ring) to cooper's ligament (posterior border of femoral ring)  
i.e. **Poupart's** to **Pectineal**

#### 2- High approach

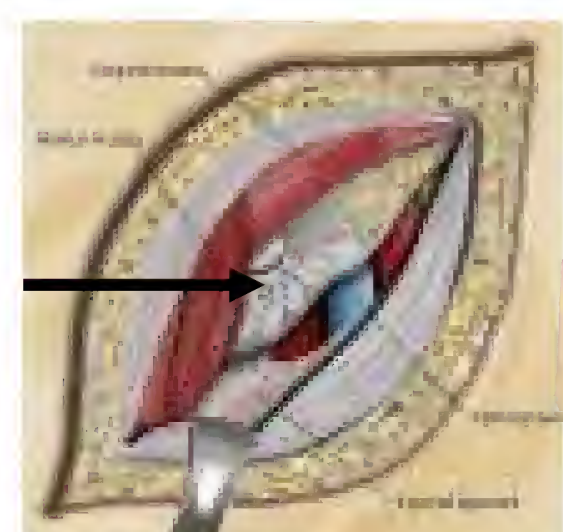
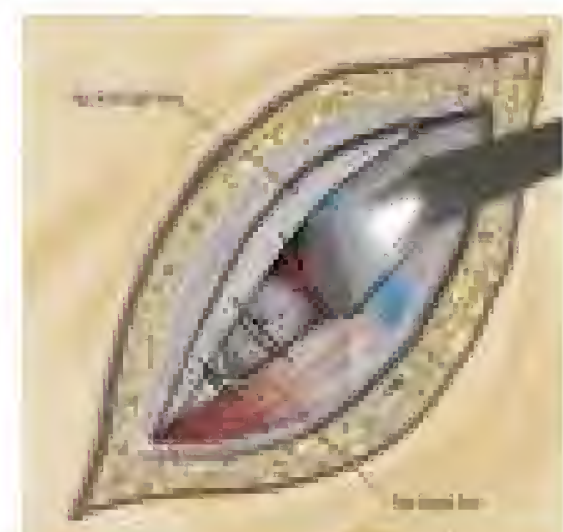
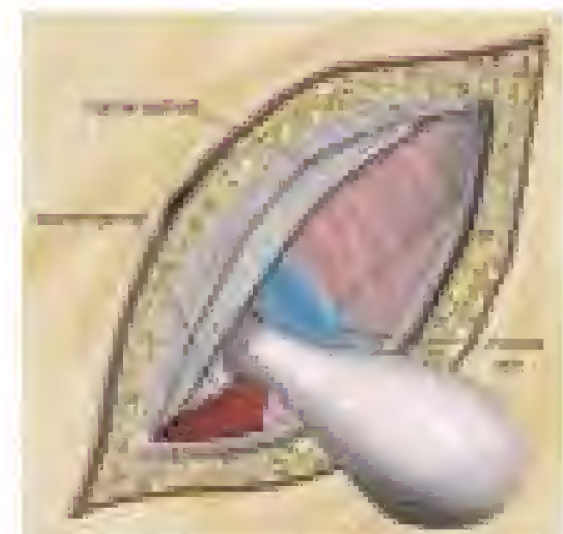
( **Lotheissen's operation** )

- The incision above & parallel to the medial **2/3** of the inguinal ligament
- The inguinal canal is opened & fascia transversalis is incised, the sac is opened & the content are reduced then the sac is transfixed & excised.
- **The repair** : as above

#### 3- Preperitoneal approach

( **Mc Evedy's operation** )

- The incision is para-rectal at lateral border of lower part of rectus abdominis.
- The incision is deepened dividing fascia transversalis Till the peritoneum then the sac is transfixed & excised.
- **The repair** : as above





### III- UMBILICAL HERNIA

1. Congenital

2. Infantile

3. Adult

#### 1. Congenital umbilical hernia

##### Exomphalos

##### **PATHOLOGY**

a. Defect

b. Sac

c. Contents

d. Coverings

##### **COMPLICATIONS**

##### **TREATMENT**

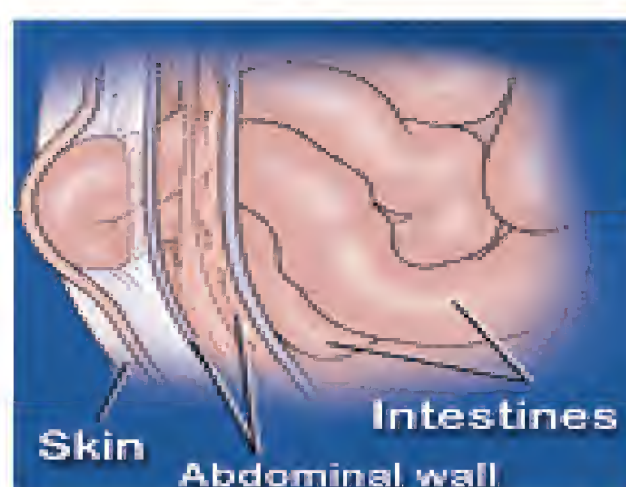
##### **Exomphalos minor**



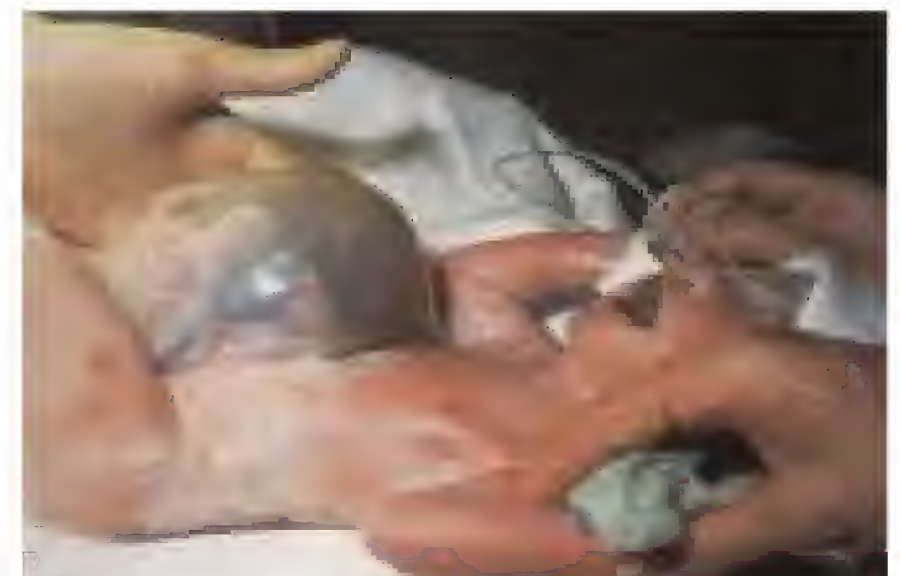
- Small (< 5 cm) at the umbilicus
- Peritoneum.
- Bowel.
- Wharton's Jelly + layer of amniotic membrane.

- During legation of an umbilical stump, a loop of intestine may be entangled in the ligature

- Content are reduced & returned to the abdomen then the sac is excised & the defect is repaired in layers



##### **Exomphalos major**



- Large (> 5 cm) at the center of abdomen.
- Peritoneum
- Bowel ± liver
- Layer of amniotic membrane

- Rupture may occur with infection → peritonitis  
(The cause of death)

##### **Urgent operation**

**The problem :** No space in abdomen to accommodate the contents so the skin on either sides of the defect is undercut then flaps will be sutured together over the sac + release incision over the flanks.

**Later on :** If infant survive, definitive repair is done.



## 2. Infantile umbilical hernia

### AETIOLOGY

- Weakness of the umbilical scar from infection
- ↑ I.A.P from cough.

### PATHOLOGY

- Defect : Umbilical scar**
- Sac :** Small, conical with **wide** neck
- Contents :** Omentum, bowel or both.
- Coverings :** 1. **Umbilical scar.**  
2. Extra- peritoneal fat

### CLINICAL PICTURE

- Patient shows umbilical protrusion on cough .
- Edges can be palpated as firm ring

### COMPLICATIONS

 Rare

### TREATMENT

**Strapping better avoided** as most of cases closed spontaneously within **2** years

**Anatomical repair** with prolene sutures if the defect more than **2** fingers or the hernia persist more than **2** years



## 3. Adult umbilical hernia

### Para-umbilical hernia

### AETIOLOGY

- Middle aged female.
- Usually obese, multipara .
- Para- umbilical & **never** umbilical.

### PATHOLOGY

- Defect : Linea alba.**
- Sac :** Small, crescentic with **narrow** neck
- Contents :** Omentum, bowel or both.
- Coverings :** 1. Skin.  
2. Superficial fascia  
3. Stretched **linea alba.**

### CLINICAL PICTURE

- Patient shows para-umbilical protrusion on cough.
- **DD** between **supra-** umbilical & **infra-** umbilical hernias by the (crescentic shape)

**N.B.: Adult umbilical hernia (acquired)**

usually seen as **everted umbilicus** with patient with ascites or ↑ I.A.P





**COMPLICATIONS** Common

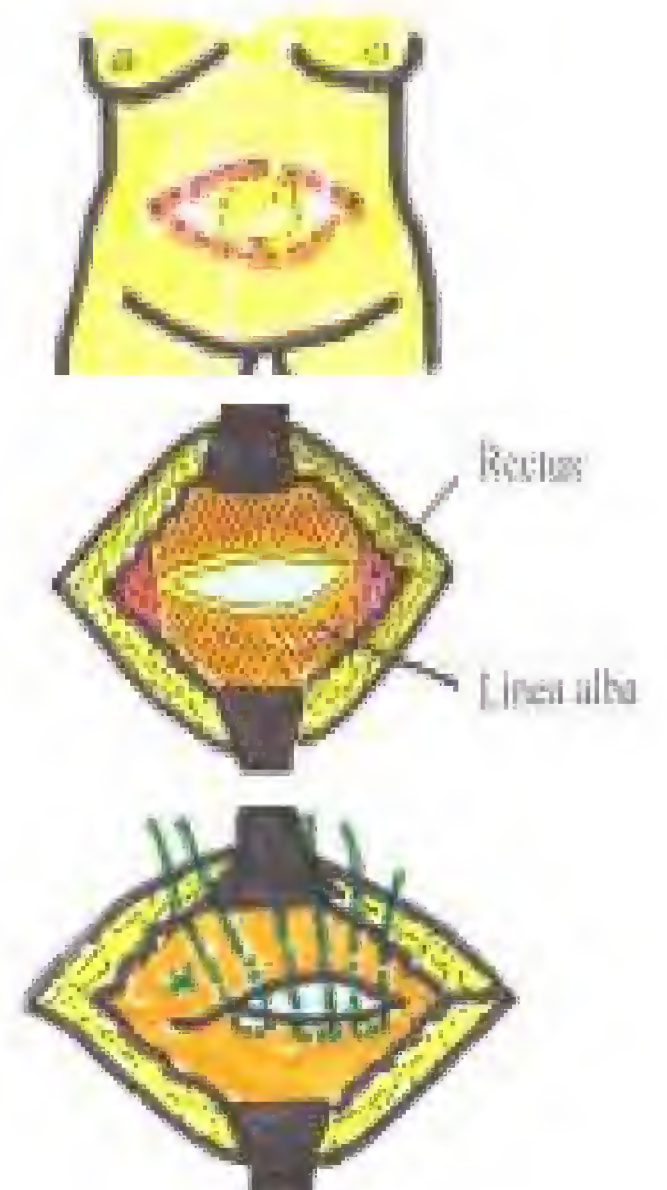
**TREATMENT**

### Mayo's repair

- Elliptical transverse incision is made over the hernia
- Sac is exposed & dissected down to the neck.
- Sac is opened at its neck because of adhesions at fundus.
- Contents are dealt with & the sac is transfixed & excised.
- **Repair** : the defect is closed by overlap of the upper flap over the lower flap of anterior rectus sheath.

### Hernioplasty

using prolene mesh .



## IV. EPIGASTRIC HERNIA

**AETIOLOGY**

Usually acquired, It is formed as a direct result of sudden strain → tearing of the interlacing fibers of linea alba.

**PATHOLOGY**

a. **Defect : Linea alba.**

b. **Sac** : may be 2 types ↗

### 1. FATTY HERNIA OF LINEA ALBA

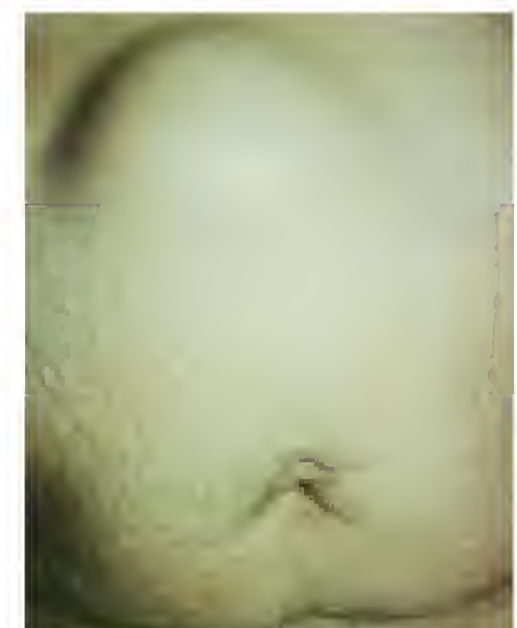
It is a protrusion of extra-peritoneal fat only without a peritoneal sac

### 2.TRUE EPIGASTRIC HERNIA

It drags a pouch of peritoneum as a hernia sac

c. **Contents** : The sac is empty (because of narrow neck) or it contains a small portion of greater omentum

d. **Coverings** : 1. Skin.  
2. S.C tissue



**CLINICAL PICTURE**

- Patient shows a small irreducible protrusion simulating to lipoma .
- Severe epigastric pain with nausea & vomiting from friction of herniated omentum on the stomach (DD peptic ulcer or gall bladder disease)

**TREATMENT**

### If the defect is small

Excision of the protruding extra peritoneal fat & the hernia sac followed by simple closure of the linea alba defect

### If the defect is large

It is repaired by **Mayo's repair**.



## V. INCISIONAL HERNIA

### DEFINITION

Hernia developing after abdominal incision.

### AETIOLOGY

#### Pre- operative causes

- Obesity .
- Diabetes mellitus, cirrhosis, steroid therapy
- Anemia & hypoproteinemia
- Respiratory problems as chronic bronchitis

#### Operative causes

- Uses of **absorbable** sutures .
- **Rough** surgical technique .
- **Tight** stitches→ devitalized wound
- Insertion of a **drain** through the wound

#### Post- operative causes

- Persistent pre-operative causes
- Wound hematoma or infection.
- Rapid return to hard work



### CLINICAL PICTURE

- Patient shows a bulge involve the surgical scar gives an expansile impulse on cough & ↑ steadily by time.

### TREATMENT

#### Anatomical repair

Repair the defect in layers according to site of incision.

#### Hernioplasty

using prolene mesh

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## VI. RARE HERNIAS

### 1. Obturator hernia

- The sac passes through the **obturator foramen** inside the pelvis so **no** external swelling so unlooked until strangulation occurs.

### TREATMENT (Trans-abdominal approach)

contents are reduced, sac is excised & obturator canal obliterated by sutures.



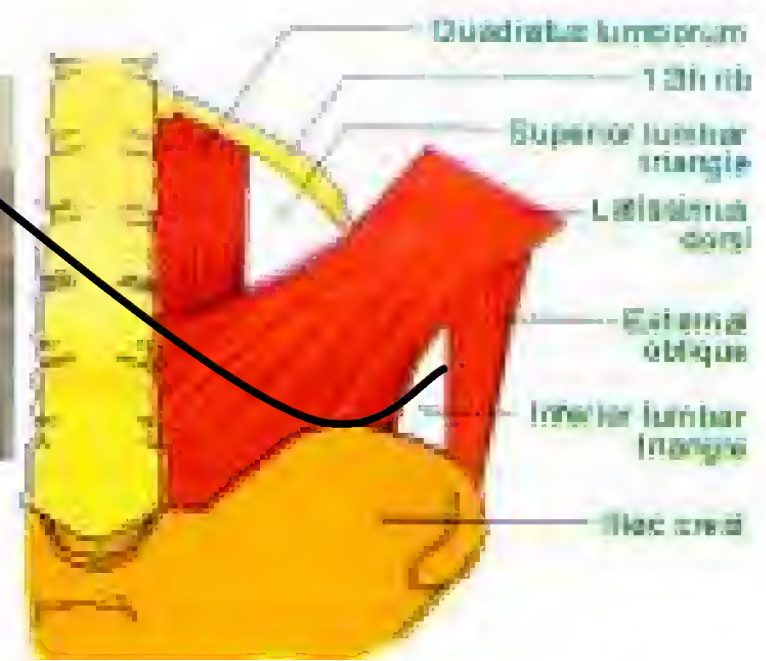


## 2. Lumbar hernia

### Petit's lumbar triangle

#### Boundaries of inferior lumbar triangle

- **Below** : Iliac crest.
- **Laterally** : Latissimus dorsi.
- **Medially** : Ext. oblique muscle.



#### TREATMENT

The hernia can be controlled by a **belt**, but if large **hernioplasty** is required.

## 3. Gluteal & Sciatic hernia

- **Gluteal hernia** → protrude through **greater** sciatic notch
- **Sciatic hernia** → protrude through **lesser** sciatic notch.



## 4. Spigelian hernia

- The sac of hernia passes through a defect in the **spigelian fascia**, the sac lies between the transversus abdominis muscle and internal oblique muscle or lie beneath the external oblique muscle
- The strangulation is very common.



#### TREATMENT

Excision of the sac & closure of the defect i.e. **herniorrhaphy**.

## 5. Perineal hernia

- It is hernia through a defect in the **levator ani** muscle, passing through the ischio-rectal fossa, then para-rectal to present itself in the perineum

